深圳市晶力泰科技有限公司

SPECIFICATION

LCD MODULE
JLT18006APCB1

REVISION RECORD

DESIGN	CHECK	REVIEW
VERSION	DATE	CONTENTS
A	2013-07-21	初始版本

CUSTOMER

Customer company:
Customer signature: Date:

CONTENTS

GENERAL INFORMATION

Item	Contents	Unit
	MAIN LCD	
LCD Type	TFT	--
Viewing direction	12:00	O′ Clock
TP AA area (W × H)		mm
TP VA area (W×H)		mm
Active area (W×H)	36.68×28.30	mm
Dit Pitch	0.14×0.12	mm
Number of Dots	220×(RGB)×176	Pixel
Driver IC	ILI9325C	--
Colors	65K	--
Input voltage	3.3V	V
Weight	TBD	g
Operating temperature	-20~+60	℃
Operating temperature	-30~+70	℃

EXTERNAL DIMENSIONS

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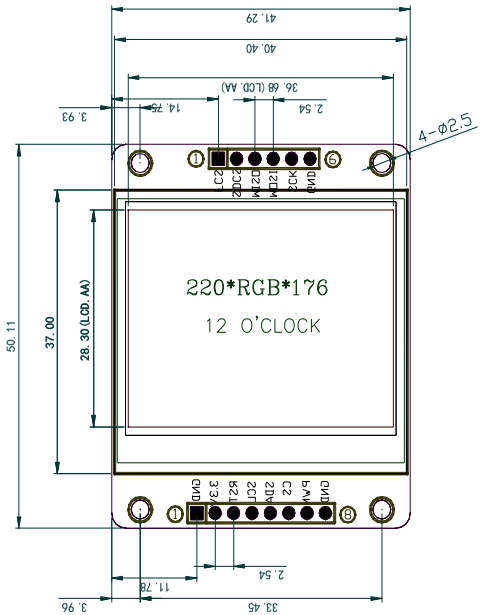
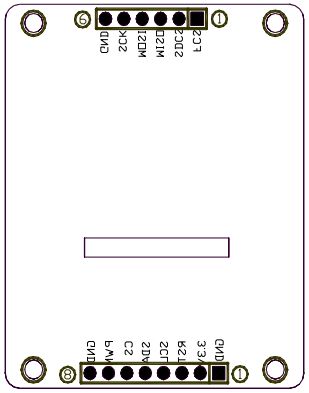
版本	更 改 内 容	拟定	日期





Pin	Description
1	GND
2	3.3V
3	RESET
4	SCL
5	SDA
6	CS
7	BL_PWM
8	GND
1	NC
2	SD_CS
3	MISO
4	MOSI
5	SCK
6	GND

NOTES:

1. DISPLAY TYPE:65K TFT TRANSMISSIVE NORMAL WHITE
2. OPERATING TEMP: -10° C~60° C
3. STORAGE TEMP: -20° C~70° C
4. LCD DRIVER: COG(IC:ILI9325);
5. BACKLIGHT: 2 CHIP-WHITE LED(Parellel)
6. GENERAL TOLERANCE:±0.20
7. ROHS

深圳市晶力泰科技有限公司				第三视角:
产品型号:	JLT18006PCBA01			
部品型号:	LCM外形图		确认:	
版本:	00	单位: MM	审核:	
日期:	2014.03.08	比例: 1:1	设计:	
UNMRKED TOLERANCE:±0.20 mm			页码:	1 OF 1

Interface Signals

1—GND	电源地
2—3.3V	3.3V
3—RESET	液晶复位
4—SCL	SPI 时钟
5—SDA	SPI 数据
6—CS	液晶片选
7—BL_PWM	背光开关控制
8—GND	GND
1—GND	GND
2—SD_CS	TF 卡 CS
3—MISO	TF 卡 SPIMISO
4—MOSI	TF 卡 SPI MOSI
5—SCK	TF 卡 SPI 时钟
6—GND	GND

ABSOLUTE MAXIMUM RATINGS

Parameter	Symbol	Min	Max	Unit
Analog power supply	VCI	-0.3	4.6	V
Logic input voltage	VDD	-0.3	4.6	V
Operating Temperature	TOP	-20	70	℃
torage Temperature	TST	-30	80	

ELECTRICAL CHARACTERISTICS

Parameter	Symbol	Condition	Min.	Typ.	Max.	Unit
Analog Power Supply Voltage	VCI	Analog Operation Voltage	2.5	2.8	3.6	V
I/O pin Power Supply Voltage	IOVCC	I/O pin Operation Voltage	1.65	2.8	3.6	V
Input high voltage	V_{IH}	IOVCC = 1.65V ~ 3.3V	0.7*IOVCC	-	IOVCC	V
Input low voltage	V_{IL}	IOVCC = 1.65V ~ 3.3V	0.0	-	0.3*IOVCC	V
Output high voltage	V_{OH}	Iout = -0.1 mA	0.8*IOVCC	-	IOVCC	V
Output low voltage	V_{OL}	Iout = +0.1 mA	0.0	-	0.2*IOVCC	V
I/O leakage current	I_{LI}	Vin=0 ~ IOVCC	-0.1		0.1	uA
Current consumption during normal operation (VCC, VCI, IOVCC)	I_{OP}	VCC=VCI=IOVCC=2.8V,Ta=25°C, GRAM data=0000h, Frame rate=60Hz, line inversion	-	TBD	-	mA
Current consumption during standby operation (VCC, VCI, IOVCC)	I_{ST}	VCC=VCI=IOVCC=2.8V, Ta=25 °C,	-	50	80	uA
LCD Drive Power Supply Current (DDVDH-GND)	I_{LCD}	VCC=VCI=IOVCC=2.8V,Ta=25°C, GRAM data=0000h, Frame rate=60Hz, line inversion		7.0	-	mA
LCD Drive voltage	DDVDH		4.5		6	Volt
Output deviation voltage	I_{DEV}				20	mV
Output offset voltage	I_{OFFSET}	Note1			35	mV

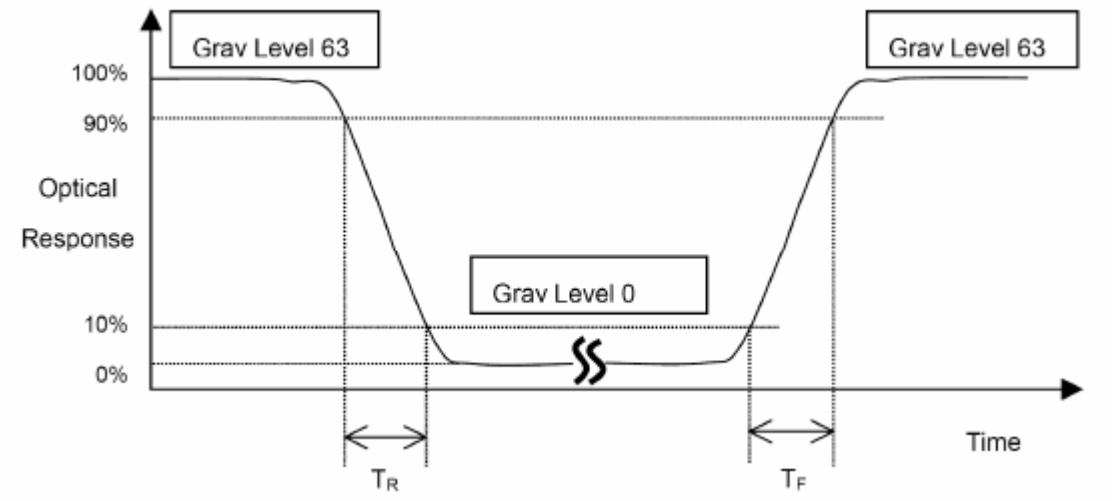
BACKLIGHT CHARACTERISTICS:

Parameter	Symbol	Min	Typ	Max	Unit
Forward Voltage	$V_{DD\_}$	3.0	3.2	3.4	V
Forward Voltage	I_{DD}	--	--	45	mA
Luminance	Lv	3600	4000	--	Cd/㎡
Chromaticity	X	0.260	--	0.310	
	Y	0.260	--	0.310	
Uniformity	▵	80	--	--	%

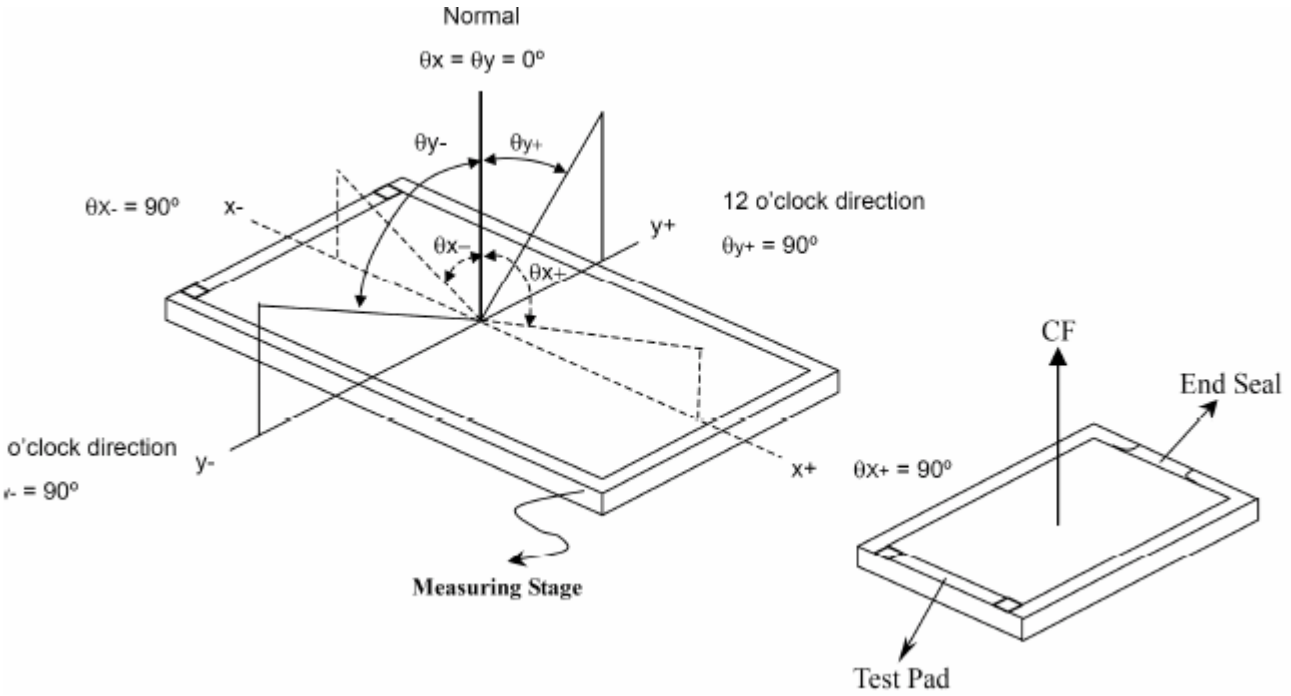
ELECTRO-OPTICAL CHARACTERISTICS

Item		Symbol	Condition	Min	Typ	Max	Unit	Remark	Note
Response time		Tr+Tf	θ =0° ∅=0° Ta=25℃	-	30	-	ms		Note 2
Contrast ratio		Cr		-	300	-	-		Note 1
Luminance uniformity		δ WHITE		80	-	-	%		Note 5
Surface Luminance		Lv		250	-	-	cd/㎡		Note 4
Viewing angle range		θ	Left	-	60	-	deg		Note 3
			Right	-	60	-	deg		
			UP	-	60	-	deg		
			Down	-	50	-	deg		
CIE(x,y) chromaticity	Red	x	θ =0° ∅=0° Ta=25℃	0.633	0.653	0.673		.	Note 4 Note 5
		y		0.310	0.330	0.350			
	Green	x		0.296	0.316	0.336			
		y		0.556	0.576	0.596			
	Blue	x		0.118	0.138	0.158			
		y		0.110	0.130	0.150			
	White	x		0.288	0.308	0.328			
		y		0.317	0.337	0.357			

***Note (1) Definition of Contrast Ratio (CR):**
The contrast ratio can be calculated by the following expression.
Contrast Ratio (CR) = L63 / L0
L63: Luminance of gray level 63
L0: Luminance of gray level 0
CR = CR (10)
CR (X) is corresponding to the Contrast Ratio of the point X at Figure in
***Note (2) Definition of Response Time (TR, TF):**



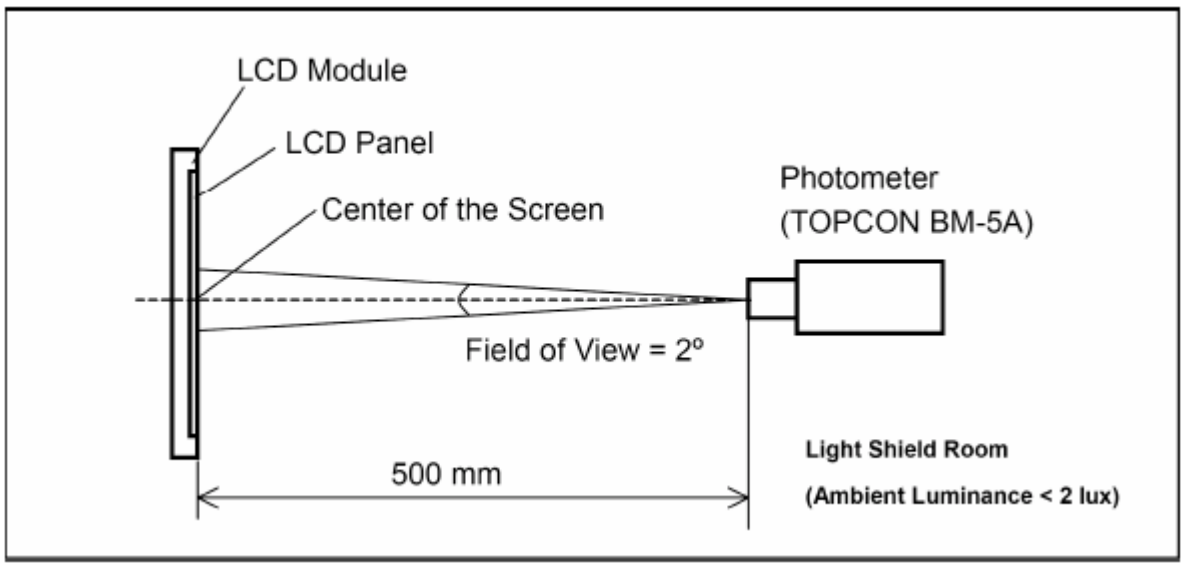
***Note(3) Definition of Viewing Angle**



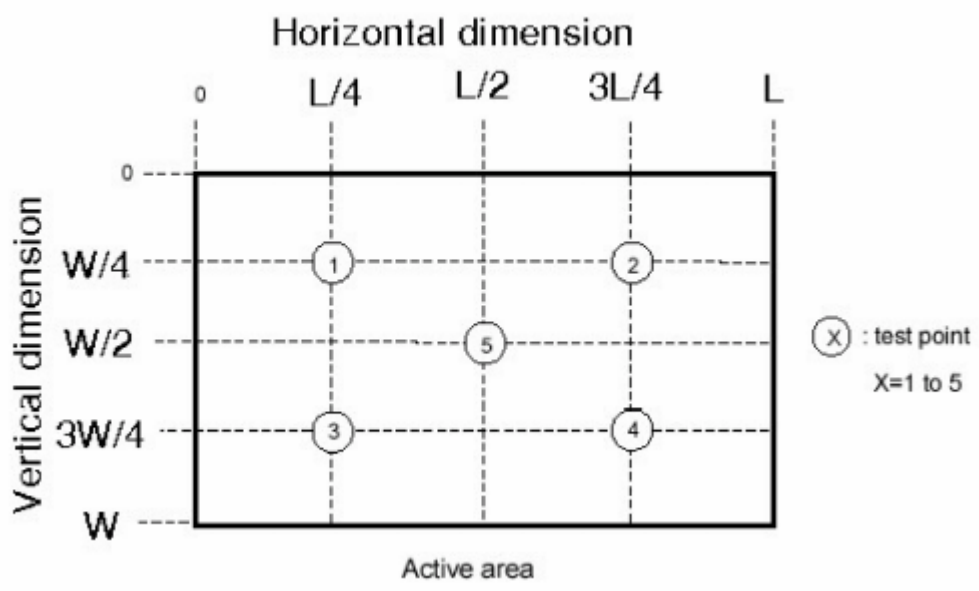
***** The above "Viewing Angle" is the measuring position with Largest Contrast Ratio; not for good image quality.View Direction for good image quality is 12O'clock. Module maker can increase the "Viewing Angle" by applying Wide View Film.**

***Note (4) Measurement Set-Up:**

The LCD module should be stabilized at a given temperature for 20 minutes to avoid abrupt temperature change during measuring. In order to stabilize the luminance, the measurement should be executed after lighting Backlight for 20 minutes in a windless room.



*Note (5)



RELIABILITY TEST

Reliability test conditions (Polarizer characteristics null)

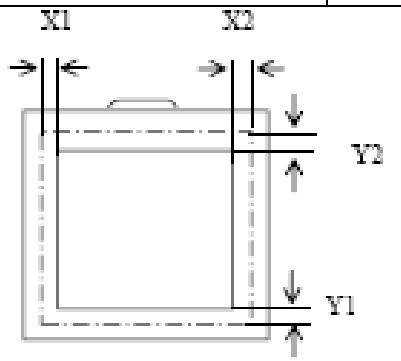
No.	Test Items	Test Condition	Remarks
1	High Temperature Storage	T = 80℃ for 240hr	Module (Without Contamination)
2	Low Temperature Storage	T = -30℃ for 240hr	
3	High Temperature Operating	T = 70℃ for 240hr	
4	Low Temperature Operating	T = -20℃ for 240hr (But no condensation of dew)	
5	High Temp. and High Humidity Operating	T = 60℃ /90% for 240hr (But no condensation dew)	
6	Thermal Shock	-30 ~ 80℃, 100cycle	

7	Packing Shock	1corner, 3edge, 6face / 76cmDrop	Packing
8	Packing Vibration	Random 1.06Grms XYZ 30min for each direction	

※ 1) No.1~ No.6 : No guarantee for panel, only for module with the above test conditions.
2) No.7~ No.8 : Refer to 7-1) Packing Ass'y on page 14.
Result Evaluation Criteria
TFT- LCD Panel should be at room temperature for 2 hours when the display quality test is over.
There should be no particular change which might affect the practical display function
and the display quality test should be conducted under normal operating condition.

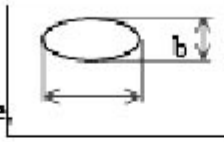
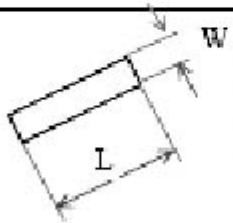
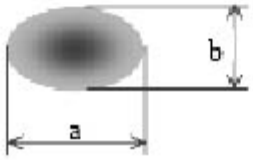
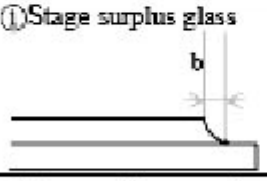
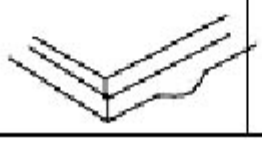
Quality level

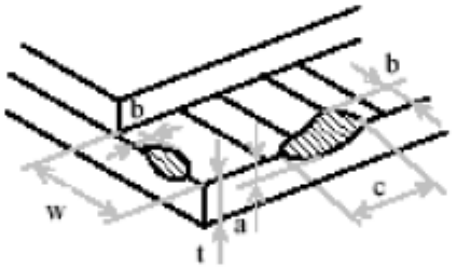
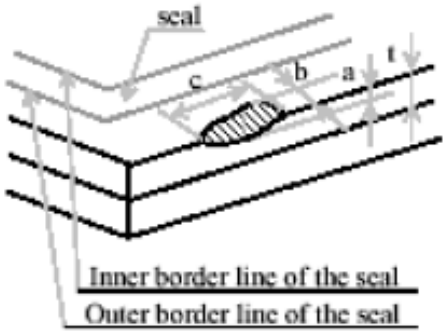
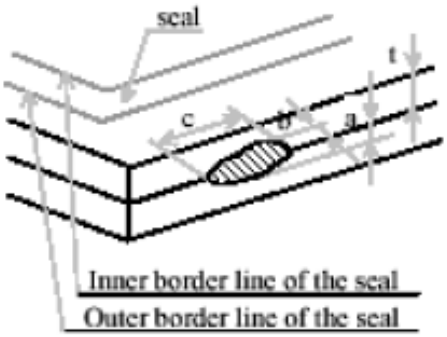
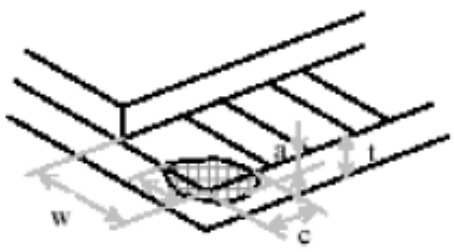
Notes for quality standard

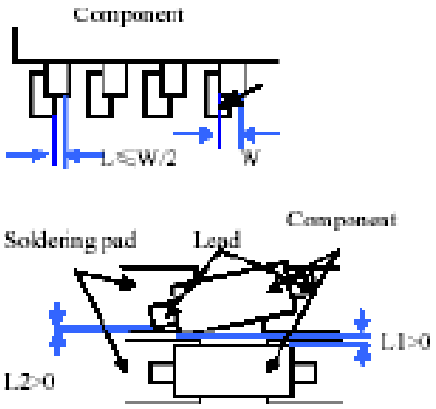
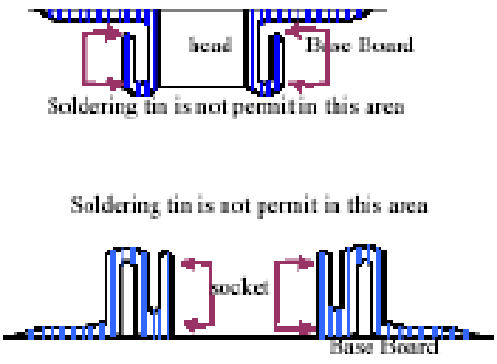
<table>
<tr><td></td><td colspan="2">Note</td></tr>
<tr><td>General</td><td colspan="2">1. Should any defects which are not specified in this standard happen, additional standard shall be determined by mutual agreement between customer and Tianma.
2. Viewing Area should be the area which Tianma guarantees.
3. Limited sample should be prior to this Inspection standard.
4. Viewing Judgement should be under static pattern.
5. Inspection conditions
Inspection distance : 250 mm (from the sample)
Temperature : 25±5℃
Inspection angle : 45degrees in LCD view direction</td></tr>
<tr><td rowspan="4">Definitions of Inspection items</td><td>Pinhole, Bright spot, Black spot, White spot, Black line, White Line, Foreign particle, Bubble</td><td>The color of a small area is different from the remainder.
The phenomenon dose not change with voltage.</td></tr>
<tr><td>Contrast variation</td><td>The color of a small area is different from the remainder.
The phenomenon changes with voltage.</td></tr>
<tr><td>Polarizer defect</td><td>Scratch, Dirt, Particle, Bubble on polarizer or between polarizer and glass.</td></tr>
<tr><td>Glass defect</td><td>Glass crack, Shaved corner of glass, Suplus glass</td></tr>
<tr><td>Definitions of Inspection ranges</td><td colspan="2"> 

Dividing A zone and B zone proceed to make a judgment.
A zone : Inside Viewing area
B zone : Outside Viewing area
X1(A.A~V.A): mm
X2(A.A~V.A): mm
Y1(A.A~V.A): mm
Y2(A.A~V.A): mm</td></tr>
<tr><td>Outgoing Inspection standard</td><td colspan="2">Inspection level II Normal Inspection. Sampling standard conforms to GB2828-2003
<table>
<tr><td>Rank</td><td>Inspection Item</td><td>AQL(Number of defective LCMs counted)</td></tr>
<tr><td>Major defect</td><td>All Functional defects(Such as No display, Display abnormally, Open or missing segment, Short circuit，Missing component, No sound, Blight abnormally),Outline dimension beyond the drawing</td><td>0.65</td></tr>
<tr><td>Minor defect</td><td>Appearance defects, such as Black/White spot, Bright spot, Pinhole, Black/White line, Contrast variation, Bubble Glass defect, Polarizer defect, and so on. Details of the standard as follows.</td><td>0.65</td></tr>
</table></td></tr>
</table>

Standards of inspection items

Inspection item			Judgement standard			
			Category		Acceptable number	
					A zone	B zone
1	Black spot, White spot Bright Spot, Pinhole Foreign Particle, Bubble and Particle Between polarizer and glass, Scratch on polarizer	 Φ=(a+b)/2(mm)	A	Φ≤0.15	Neglecte	Neglected
			B	0.15<Φ≤0.20	3	
			C	0.20<Φ≤0.30	2	
			D	0.30<Φ	0	
			Total defective point(B,C)		5	
2	Black line, White line, Bubble and Particle Between Polarizer and glass, Scratch on polarizer	 W:Width, L:Length(mm)	A	W≤0.10	Neglected	Neglected
			B	0.01<W≤0.03 L≤3.0	3	
			C	0.03<W≤0.05 L≤3.0	2	
			D	0.05<W	0	
			Total defective point(B,C)		5	
3	Contrast variation	 Φ=(a+b)/2(mm)	A	Φ≤0.2	Neglected	Neglected
			B	0.2<Φ≤0.3	3	
			C	0.3<Φ≤0.4	2	
			D	0.4<Φ	0	
			Total defective point(B,C)		5	
4	Bubble inside cell		any size		none	none
5	Polarizer defect (if Polarizer is used)	Scratch and damage on polarizer, Particle on polarizer or between polarizer and glass.	Refer to item 1 and item 2.			
		Bubble, dent and convex	A	Φ≤0.25	Neglected	Neglected
			B	0.25<Φ≤0.5	3	
			C	0.5<Φ	0	
			Total defective point(B,C)		3	
6	Surplus glass	①Stage surplus glass 	b≤0.3mm			
		②Surrounding surplus glass 	Should not influence outline dimension and assembling.			

<table>
<tr><th colspan="3" rowspan="2">Inspection item</th><th colspan="2">Judgment standard</th></tr>
<tr><th colspan="2">Category(application: B zone)</th></tr>
<tr><td rowspan="5">7</td><td rowspan="5">Glass defect crack</td><td rowspan="4">①The front of lead terminals
 
</td><td>A</td><td>If a ≤ t and b ≤ 1.0, c is not limited</td></tr>
<tr><td>B</td><td>a ≤ t, 1 ≤ b ≤ 2mm, c ≤ 3mm</td></tr>
<tr><td>C</td><td>If glass crack cover alignment mark, b ≤ 0.5mm.</td></tr>
<tr><td>D</td><td>Crack at two sids of lead terminals should not cover patterns and alignment mark</td></tr>
<tr><td>②Surrounding crack—non-contact side
 
</td><td colspan="2">b < Inner borderline of the seal</td></tr>
<tr><td>③ Surrounding crack— contact side
 
</td><td colspan="2">b < Outer borderline of the seal</td></tr>
<tr><td rowspan="2">④Corner
 
</td><td>A</td><td>a ≤ t, b ≤ 3.0, c ≤ 3.0</td></tr>
<tr><td colspan="2">*Glass crack should not cover patterns used for</td></tr>
</table>

Inspection item			Judgement standard
8	PCB defect	Component soldering: No cold soldering、short、open circuit、burr、tin ball The flat encapsulation component position deviation must be less than 1/2 width of the pin (Pic.1); the sheet component deviation: Pin deviates from the pad and contact with the near components is not permitted (Pic.2)	
		lead defect: The lead lack must be less than 1/2 of its width; The lead burr must be less than 1/2 of the seam; Impurities connect with the near leads is not permitted	
		Connector soldering: Soldering tin is at contact position of the plug and socket is not permitted No foundation is sealed Serious cave distortion on plug and socket contact pin is not permitted	

Precautions for Use of LCD Modules

Handling Precautions

1.1 The display panel is made of glass. Do not subject it to a mechanical shock by dropping it from a high place, etc.

1.2 If the display panel is damaged and the liquid crystal substance inside it leaks out, be sure not to get any in your mouth, if the substance comes into contact with your skin or clothes, promptly wash it off using soap and water.

1.3 Do not apply excessive force to the display surface or the adjoining areas since this may cause the color tone to vary.

1.4 The polarizer covering the display surface of the LCD module is soft and easily scratched. Handle this polarizer carefully.

1.5 If the display surface is contaminated, breathe on the surface and gently wipe it with a soft dry cloth. If still not completely clear, moisten cloth with one of the following solvents:

— Isopropyl alcohol

— Ethyl alcohol

Solvents other than those mentioned above may damage the polarizer. Especially, do not use the following:

— Water

— Ketone

— Aromatic solvents

1.6 Do not attempt to disassemble the LCD Module.

1.7 If the logic circuit power is off, do not apply the input signals.

1.8 To prevent destruction of the elements by static electricity, be careful to maintain an optimum work environment.

a. Be sure to ground the body when handling the LCD Modules.

b. Tools required for assembly, such as soldering irons, must be properly ground.

c. To reduce the amount of static electricity generated, do not conduct assembly and other work under dry conditions.

d. The LCD Module is coated with a film to protect the display surface. Be care when peeling off this protective film since static electricity may be generated.

2 Storage precautions

2.1 When storing the LCD modules, avoid exposure to direct sunlight or to the light of

fluorescent lamps.

2.2 The LCD modules should be stored under the storage temperature range. If the LCD modules will be stored for a long time, the recommend condition is:

Temperature : 0℃ ~ 40℃

Relatively humidity: ≤80%

2.3 The LCD modules should be stored in the room without acid, alkali and harmful gas.

3 The LCD modules should be no falling and violent shocking during transportation, and also should avoid excessive press, water, damp and sunshine.

Packaging

Package quantity in one inside box: 112 pcs
Package quantity in one outside box: 448 pcs
1 inside box=14TRAY +1TRAY(dummy, top)=15 tray
Inside Box size: 360*273*143mm
Outside box size: 567*370*298mm
One Outside box contains 4 packets